



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/648,594	08/25/2003	Ga-Lane Chen		4258

25859 7590 03/14/2005  
WEI TE CHUNG  
FOXCONN INTERNATIONAL, INC.  
1650 MEMOREX DRIVE  
SANTA CLARA, CA 95050

EXAMINER VORTMAN, ANATOLY	
ART UNIT 2835	PAPER NUMBER

DATE MAILED: 03/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/648,594

Applicant(s)

CHEN ET AL. 

Examiner

Anatoly Vortman

Art Unit

2835

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 February 2005.  
2a) ☒ This action is **FINAL**.                      2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 and 8-20 is/are pending in the application.  
    4a) Of the above claim(s) 12-19 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-6, 8, 9 and 20 is/are rejected.  
7) ☒ Claim(s) 10 and 11 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
    a) ☒ All    b) ☐ Some \*    c) ☐ None of:  
        1. ☒ Certified copies of the priority documents have been received.  
        2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
        3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
    \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Amendment***

1. The submission of the Applicant's amendment filed on 02/10/05 is acknowledged. Claim 11 has been amended, claim 7 has been cancelled and new claim 20 has been added. No amendments as to the scope of the claims have been made. Claims 12-19 have been withdrawn from consideration. Thus, claims 1-6 and 8-20 are pending in the instant application.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-6 and 8, are rejected under 35 U.S.C. 102(e) as being anticipated by  
US/2004/0097635 to Fan et al., (Fan).

The applied reference has a common assignee (Hon Hai Precision Ind. Co., LTD) with the instant application. Based upon the earlier effective U.S. filing date of the reference (03/31/03), it constitutes prior art under 35 U.S.C. 102(e) (US filing date of the instant application is 08/25/03). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claims 1 and 2, Fan disclosed (Fig. 6, 7) a thermal interface material (40) comprising: a polymer matrix (32) having a thermally conductive first face (42) and an opposite thermally conductive second face (44); and a plurality of carbon nanocapsules (32) incorporated in the polymer matrix (22), wherein the polymer is a reaction product of a polyether polyol and an isocyanate (column 4, lines 3+).

Regarding claim 8, Fan disclosed that said carbon nanocapsules are enclosed with thermally conductive material (42, 44).

Regarding claims 3-6, the claims recite ingredients and ranges for said ingredients, used for forming the end product and therefore, are directed to a method of forming the device. It has been held that even though the claims are limited by and defined by the recited process, the determination of patentability of the product is based on the product itself, and does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985). Therefore the claims had not been given patentable weight.

Art Unit: 2835

4. Alternatively, claims 1-6 and 8, are rejected under 35 U.S.C. 102(a)(e) as being anticipated by US/6,407,922 to Eckblad et al., (Eckblad) (cited on IDS).

Regarding claim 1, Eckblad disclosed (Fig. 1 and 2) a thermal interface material (5) comprising: a polymer matrix (15) having a thermally conductive first face (11) and an opposite thermally conductive second face (13); and a plurality of carbon nanocapsules (17) incorporated in the polymer matrix (15).

Regarding claim 8, Eckblad disclosed that said carbon nanocapsules (17) are enclosed with thermally conductive material (11, 13).

Regarding claims 2-6, the claims recite ingredients and ranges of said ingredients used for forming the end product and therefore, are directed to a method of forming the device. It has been held that even though the claims are limited by and defined by the recited process, the determination of patentability of the product is based on the product itself, and does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985). Therefore the claims had not been given patentable weight.

5. Yet, alternatively, claims 1-6 and 8, are rejected under 35 U.S.C. 102(e) as being anticipated by US/2004/0005736 to Searls et al., (Searls).

Regarding claim 1, Searls disclosed (Fig. 3) a thermal interface material (26) comprising: a polymer matrix (40) having a thermally conductive first face (12) and an opposite thermally

Art Unit: 2835

conductive second face (16); and a plurality of carbon nanocapsules (38) incorporated in the polymer matrix (40).

Regarding claim 8, Searls disclosed that said carbon nanocapsules (38) are enclosed with thermally conductive material (12, 16).

Regarding claims 2-6, the claims recite ingredients and ranges for said ingredients used for forming the end product and therefore, are directed to a method of forming the device. It has been held that even though the claims are limited by and defined by the recited process, the determination of patentability of the product is based on the product itself, and does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985). Therefore the claims had not been given patentable weight.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 9 and 20, are rejected under 35 U.S.C. 103(a) as being unpatentable over either Eckblad or Searls, each taken alone.

Art Unit: 2835

Regarding claim 9, Eckblad or Searls disclosed all as apply to claim 8, but that said thermally conductive material is indium or copper.

Since indium and copper have been notoriously known in the cooling art at the time the invention was made as good thermal conductors and have been extensively used for making heat conductive components, it would have been obvious to a person of ordinary skill in the cooling art at the time the invention was made to select indium or copper as the thermally conductive materials of Fan, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claim 20, Eckblad or Searls disclosed all, but that the diameter of the nanocapsule is in the range from 5 to 50nm.

It would have been obvious to a person of ordinary skill in the nanotechnology arts at the time the invention was made to form nanocapsules having diameter in any desirable range, including the aforementioned 5 to 50nm, in order to achieve a desired rate of the heat exchange, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

***Allowable Subject Matter***

Art Unit: 2835

8. Claims 10 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 10 and 11, parent claim 10 recites: “metal nano-grains”. The aforementioned limitations in combination with all remaining limitations of claim 10, are believed to render said claims 10 and 11 patentable over the art of record.

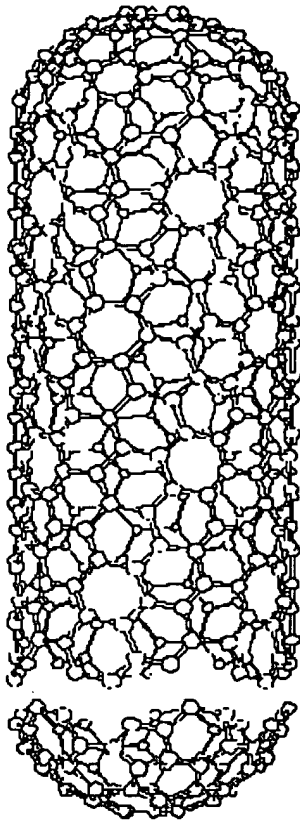
### *Response to Arguments*

10. Applicant's arguments have been fully considered but they are not persuasive. The main thrust of the Applicant's arguments is directed to the assumption that: “one skilled in the art knows that “carbon nanotubes” have a hollow tubular structure” (p. 13, lines 1-4 of the Amendment) and therefore, Applicant concludes, the nanotubes cannot be considered as nanocapsules.

To the contrary, the Examiner believes that one skilled in the nanotechnology field of endeavor knows that carbon nanotubes are fullerene-related structures which consist of graphene cylinders **closed at either end with caps containing pentagonal rings** (see: [http:// www.personal.rdg.ac.uk/~scsharip/tubes.htm](http://www.personal.rdg.ac.uk/~scsharip/tubes.htm)).

The average single layered nanotube looks like presented on the Figure below (see: <http://www.research.ibm.com/nanoscience/nanotubes.html>):





It is clear from the definition and from the figure that nanotube is a sealed hollow object (i.e. a capsule), which perfectly fits the definition of the capsule cited by the Applicant.

Therefore, the outstanding rejection of the claims is deemed to be proper and is maintained herein.

### ***Conclusion***

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2835

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anatoly Vortman whose telephone number is 571-272-2047. The examiner can normally be reached on Monday-Friday, between 10:00 am and 6:30 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Lynn Feild can be reached on 571-272-2092. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

Art Unit: 2835

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AV

A handwritten signature in dark ink, appearing to read 'A. Vortman', followed by a long horizontal line extending to the right.

Anatoly Vortman  
Primary Examiner  
Art Unit 2835